

appendix **A**

Refined Designated Uses for the Chesapeake Bay and Tidal Tributaries

BACKGROUND

Federal water quality standards regulations establish that states must specify appropriate water uses to be achieved and protected. Current designated uses applied to the waters of the Chesapeake Bay and its tidal tributaries do not fully reflect natural conditions and are too broad in their definition of ‘use’ to support the adoption of more habitat-specific aquatic life criteria. Furthermore, they change across jurisdictional borders in the same body of water.

Under the federal water quality standards regulation, states may adopt subcategories of uses, seasonal uses and may remove uses under certain conditions (including natural, physical and socio-economic conditions). If a state wishes to remove or establish a subcategory of a designated use that requires a less stringent water quality criteria, the state must conduct a use-attainability study. States must also demonstrate that all water uses present on or after November 28, 1975, will always be protected.

The *Chesapeake 2000* agreement and the subsequent six state, District of Columbia and EPA memoranda of understanding challenged the Bay watershed jurisdictions to, “by 2010, correct the nutrient- and sediment-related problems in the Chesapeake Bay and its tidal tributaries sufficiently to remove the Bay and the tidal portions of its tributaries from the list of impaired waters under the Clean Water Act” (Chesapeake Executive Council 2000; Chesapeake Bay Watershed Partners 2001).

These agreements included commitments to “define the water quality conditions necessary to protect aquatic living resources” by 2001 and to have the jurisdictions with tidal waters “use their best efforts to adopt new or revised water quality standards consistent with the defined water quality conditions” by 2003. Against this backdrop of a renewed commitment to restore Bay water quality (in part through the adoption of a consistent set of Chesapeake Bay water quality criteria as state standards), it was recommended that the underlying tidal-water designated uses must be refined to better reflect desired Bay water quality conditions.

In considering the refinement of the tidal-water designated uses, the six Bay watershed states and the District of Columbia should take into account five principal considerations:

- Habitats used in common by sets of species and during particular life stages should be delineated as separate designated uses;
- Natural variations in water quality should be accounted for by the designated uses;
- Seasonal uses of different habitats should be factored into the designated uses;
- The Chesapeake Bay criteria for dissolved oxygen, water clarity and chlorophyll *a* should be tailored to support each designated use; and
- The refined designated uses applied to the Chesapeake Bay and its tidal tributaries will support the federal Clean Water Act and state goals for uses existing in these water since 1975 and for potential uses not currently met.

The five proposed designated uses were derived to reflect the habitats of an array of recreationally, commercially and ecologically important species. The supporting prey communities were given full consideration along with the ‘target species’ in defining the designated uses. The Chesapeake Bay criteria were based on effects data from a wide array of species and biological communities to capture the range of sensitivities of the thousands of aquatic species inhabiting the Chesapeake Bay and tidal tributary estuarine habitats. As the U.S. Environmental Protection Agency (2003a) documents extensively, the only species formally listed as threatened or endangered that would be affected by the Chesapeake Bay criteria was the shortnose sturgeon. Low dissolved oxygen effects data for shortnose sturgeon were part of the larger scientific data base used to derive the Chesapeake Bay dissolved oxygen criteria.

This appendix broadly describes the five designated uses and the general boundaries between the migratory fish spawning and nursery; shallow-water bay grass; open-water fish and shellfish; deep-water seasonal fish and shellfish; and deep-channel seasonal refuge designated use habitats (Table A-1). Figure 1 in the Executive Summary illustrates the conceptual framework of the refined tidal-water designated uses. More detailed descriptions of and documentation on the five designated uses are published in the *Technical Support Document for the Identification of Chesapeake Bay Designated Uses and Attainability* (U.S. EPA 2003b).

CHESAPEAKE BAY TIDAL-WATER DESIGNATED USES

The following descriptions of designated uses provide the context for deriving dissolved oxygen, water clarity and chlorophyll *a* water quality criteria for the Chesapeake Bay provided in this *Regional Criteria Guidance*. Correct application of water quality criteria depends on the accurate delineation of these designated uses. For example, each of these designated uses have distinct dissolved oxygen criteria derived to match the respective level of protection required.

Table A-1. General descriptions of the five proposed Chesapeake Bay tidal-water designated uses.

Migratory Fish Spawning and Nursery Designated Use: Aims to protect migratory finfish during the late winter/spring spawning and nursery season in tidal freshwater to low-salinity habitats. This habitat zone is primarily found in the upper reaches of many Bay tidal rivers and creeks and the upper mainstem Chesapeake Bay and will benefit several species including striped bass, perch, shad, herring and sturgeon.

Shallow-Water Designated Use: Designed to protect underwater bay grasses and the many fish and crab species that depend on the shallow-water habitat provided by grass beds.

Open-Water Fish and Shellfish Designated Use: Designed to protect water quality in the surface water habitats within tidal creeks, rivers, embayments and the mainstem Chesapeake Bay year-round. This use aims to protect diverse populations of sportfish, including striped bass, bluefish, mackerel and seatrout, bait fish such as menhaden and silversides, as well as the listed shortnose sturgeon.

Deep-Water Seasonal Fish and Shellfish Designated Use: Aims to protect living resources inhabiting the deeper transitional water column and bottom habitats between the well-mixed surface waters and the very deep channels during the summer months. This use protects many bottom-feeding fish, crabs and oysters, as well as other important species, including the bay anchovy.

Deep-Channel Seasonal Refuge Designated Use: Designed to protect bottom sediment-dwelling worms and small clams that act as food for bottom-feeding fish and crabs in the very deep channel in summer. The deep-channel designated use recognizes that low dissolved oxygen conditions prevail in the deepest portions of this habitat zone and will naturally have very low to no oxygen during the summer.

The watershed states with tidally influenced Chesapeake Bay waters—Maryland, Virginia, Delaware and the District of Columbia—have the ultimate responsibility for defining and adopting the designated uses into their state water quality standards. These uses will be adopted as subcategories of current state tidal-water designated uses, which are designed to protect aquatic life. The formal process for refining designated uses will meet the requirements of the Clean Water Act. The adopted designated uses will protect existing aquatic and human uses of the tidal waters that have been present since 1975, as well as potential uses. The specific use definitions and the spatial application of the final designated uses will undergo public review and the four jurisdictions' respective regulatory adoption processes prior to final approval by EPA.

MIGRATORY FISH SPAWNING AND NURSERY DESIGNATED USE

Waters with this designated use support the survival, growth and propagation of balanced indigenous populations of ecologically, recreationally and commercially

important anadromous, semi-anadromous and tidal-fresh resident fish species inhabiting spawning and nursery grounds from February 1 through May 31.

Chesapeake Bay tidal waters support spawning areas and juvenile nurseries for a host of anadromous and semi-anadromous fish, important not only to Chesapeake Bay fishery populations, but also to those of the entire East Coast, such as striped bass. The eggs, larvae and early juveniles of anadromous and semi-anadromous species often have more sensitive habitat quality requirements than other species and life stages (Funderburk et al. 1991; Jordan et al. 1992). Thus, the combined migratory spawning and nursery habitats were delineated as a refined tidal-water designated use for the Chesapeake Bay and its tidal tributaries.

Designated Use Boundary Delineation

The boundaries of the migratory fish spawning and nursery designated use are broadly delineated from the upriver extent of tidally influenced waters to the down-river and lower Bay spawning and nursery habitats that have been determined through a composite of all targeted anadromous and semi-anadromous fish species' spawning and nursery habitats. Free-flowing streams and rivers, where several of the target species (such as shad and river herring) migrate for spawning, are protected through other existing state water quality standards.

From February 1 through May 31, the migratory fish spawning and nursery designated use coincides with and, therefore, encompasses portions of the shallow-water bay grass and open-water fish and shellfish designated use habitats. Therefore, the horizontal and vertical delineations for the migratory fish spawning and nursery designated use are the same as those of the open-water fish and shellfish designated uses. For those areas designated for migratory spawning and nursery uses, the designated use extends horizontally from the intertidal zone (mean low water) across the body of water to the adjacent intertidal zone, and down through the water column to the bottom sediment-water interface.

SHALLOW-WATER BAY GRASS DESIGNATED USE

Waters with this designated use support the survival, growth and propagation of rooted, underwater bay grasses necessary for the propagation and growth of balanced, indigenous populations of ecologically, recreationally and commercially important fish and shellfish inhabiting vegetated shallow-water habitats.

Designated Use Rationale

The shallow-water bay grass designated use protects a wide variety of species, such as largemouth bass and pickerel, which inhabit vegetated tidal-fresh and low-salinity habitats; juvenile speckled sea trout in vegetated higher salinity areas; and blue crabs that inhabit vegetated shallow-water habitats covering the full range of salinities encountered in the Chesapeake Bay and its tidal tributaries. Underwater bay grasses,

the critical community that the designated use protects, provide the shelter and food that make shallow-water habitats so unique and integral to the productivity of the Chesapeake Bay ecosystem. Many Chesapeake Bay species depend on vegetated shallow-water habitats at some point during their life cycle (Funderburk et al. 1991). Given the unique nature of this habitat and its critical importance to the Chesapeake Bay ecosystem, shallow waters were delineated as a refined tidal-water designated use for the Chesapeake Bay and its tidal tributaries.

The shallow-water bay grass designated use is intended specifically to delineate the habitats where the water clarity criteria would apply. The open-water fish and shellfish designated use and the accompanying dissolved oxygen criteria will fully protect the biological communities inhabiting shallow-water habitats. The open-water fish and shellfish designated use extends into the intertidal zone and protects shallow-water organisms that do not depend on bay grasses. The seasonal shallow-water bay grass designated use, similar to the migratory fish spawning and nursery use, actually coincides with the year-round open-water designated use and provides specific protection for underwater bay grasses through the application of water clarity criteria.

Designated Use Boundary Delineation

The shallow-water bay grass designated use covers tidally influenced waters from the intertidal zone to a Chesapeake Bay Program segment-specific depth contour from 0.5 to 2 meters. The shallow-water designated use applies during the bay grass growing season: April 1 through October 31 for tidal-fresh, oligohaline and mesohaline segments, and March 1 through May 31 and September 1 through November 30 for polyhaline segments.

OPEN-WATER FISH AND SHELLFISH DESIGNATED USE

Waters with this designated use support the survival, growth and propagation of balanced, indigenous populations of ecologically, recreationally and commercially important fish and shellfish species inhabiting open-water habitats.

Designated Use Rationale

The natural temperature and salinity stratification of open waters influence dissolved oxygen concentrations, and thus the distribution of Chesapeake Bay species. Waters located above the pycnocline with higher oxygen levels support a different community of species than deeper waters from late spring to early fall. Several well-known species that inhabit these open waters are menhaden, striped bass and bluefish. Their habitat requirements and prey needs differ from those of species and communities inhabiting deeper water habitats during the summer months.

Designated Use Boundary Delineation

From June 1 through September 30, the open-water designated use includes tidally influenced waters extending horizontally from the shoreline measured at mean low

water, to the adjacent shoreline, and extending through the water column to the bottom. If the presence of a pycnocline prevents oxygen replenishment, the open-water fish and shellfish designated use extends only as far as the upper boundary of the pycnocline. If a pycnocline exists but other physical circulation patterns (such as the inflow of oxygen-rich oceanic bottom waters) provide oxygen replenishment to the deep waters, the open-water fish and shellfish designated use extends to the bottom water-sediment interface.

From October 1 through May 31, the boundaries of the open-water designated use include all tidally influenced waters extending horizontally from the shoreline, measured at mean low water, to the adjacent shoreline, and down into the water column to the bottom water-sediment interface.

DEEP-WATER SEASONAL FISH AND SHELLFISH DESIGNATED USE

Waters with this designated use protect the survival, growth and propagation of balanced, indigenous populations of important fish and shellfish species inhabiting deep-water habitats.

Designated Use Boundary Delineation

This designated use refers to tidally influenced waters located between the measured depths of the upper and lower boundaries of the pycnocline, where a measured pycnocline is present and presents a barrier to oxygen replenishment from June 1 through September 30. In some areas, the deep-water designated use extends from the upper boundary of the pycnocline down to the sediment/water interface at the bottom, where a lower boundary of the pycnocline is not calculated due to the depth of the water column.

DEEP-CHANNEL SEASONAL REFUGE DESIGNATED USE

Waters within this designated use must protect the survival of balanced, indigenous populations of ecologically important benthic infaunal and epifaunal worms and clams, which provide food for bottom-feeding fish and crabs.

Designated Use Boundary Delineation

Deep-channel seasonal refuge designated use waters are defined as tidally influenced waters at depths greater than the measured lower boundary of the pycnocline in isolated deep channels. The deep-channel designated use is defined laterally by bathymetry of the trough and vertically by the lower boundary of the pycnocline above, and below, at the sediment-water interface on the bottom.

LITERATURE CITED

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